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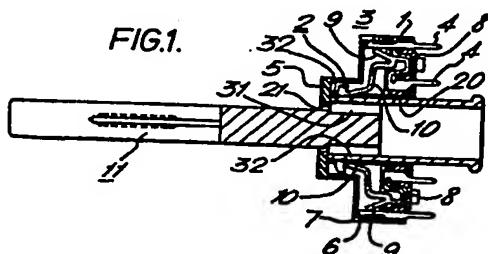
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64 Electrical switch, operated by a removable key.

(2) An electrical switch for use as a coding device comprises a plurality of pairs of associated contacts (2, 3) carried in a circular array by a base (1) and enclosed by a cover (5), and a coding key (11) receivable in holes (20, 21) in the base (1) and cover (5) and having removable actuator surfaces (32) the presence or absence of each of which determines the closed or open state of an associated pair of contacts (2, 3).



*TITLE MODIFIED
see front page*

Electrical Switch

This invention relates to an electrical switch, and particularly to an electrical switch for use as a coding device.

5 In many industries there is a need for a coding device which can be selectively set to make any desired one or more of a plurality of possible circuits through the device.

10 According to this invention an electrical switch is characterised by a plurality of resilient contacts mounted on an insulating base in an array about a hole in the base; a plurality of fixed contacts mounted on the base and respectively associated with the resilient contacts; and a coding key receivable in the hole in the base in a 15 particular orientation and formed with a plurality of removable actuator surfaces respectively associated with the resilient contacts, the presence or absence of any actuator surface determining the closed or open state of the associated resilient and fixed contact pair when the key is 20 inserted into the hole in the base.

An electrical switch according to this invention will now be described by way of example with reference to the drawings, in which:-

25 Figure 1 is a longitudinal sectional view through the switch;

Figure 2 is a view of the left-hand end of the switch as shown in Figure 1;

Figure 3 is a view of the right-hand end of the switch as shown in Figure 1; and

30 Figure 4 is a perspective view of the coding key of

the switch.

The switch comprises a circular base 1 moulded from a synthetic plastics material and carrying a plurality of resilient metal contacts 2 arranged in a circle about the 5 centre of the base 1 and a corresponding plurality of fixed metal contacts 3 respectively associated with the resilient contacts 2 and arranged in a circle about the resilient contacts 2. Each of the resilient and fixed contacts 2 and 3 has a pin portion 4 projecting from a 10 common surface of the base 2 for receipt in a hole in a printed circuit board (not shown).

The contacts 2 and 3 are enclosed on the base 1 by a cover 5 moulded from synthetic plastics material and secured to the base 1 by the fixed contacts 3 which have 15 hooked ends 6 remote from the pin portions 4, which engage in respective holes 7 around the periphery of the cover 5.

Each resilient contact 2 extends from the pin portion 4 as a single, sinuous inner limb 8 which divides into two outer limbs 9 and 10 one of which (9) co-operates with the 20 associated fixed contact 3 to provide a switch function, and the other of which (10) projects inwardly towards the axis of the base 1 and cover 5. The form and operation of such resilient contacts are fully discussed in EP-A-0016550 and will not therefore be discussed in detail herein.

25 The switch is completed by a coding key 11 receivable through aligned holes 20 and 21 in the base 1 and cover 5 respectively. The key 11 is substantially T-shaped having a head 12 carried by a first circular cross-section portion 13 of relatively larger diameter, which carries at its 30 other end a second circular cross-section portion 14 of relatively small diameter. The portion 13 is formed with a pair of diametrically opposed radially extending longitudinal ribs 15, while the portion 14 is formed with a similar pair of ribs 16 aligned with the ribs 15. End 35 portions 17 of the ribs 16 adjacent the portion 13 are free

of the portion 14 and are flared outwardly. One of the ribs 16 (lower one in Figure 4) has a portion 18 at its end remote from the flared, free end portion 17 of greater thickness than the remainder of that rib 16 and greater than the thickness of the other rib 16.

The holes 20 and 21 in the base 1 and cover 5, which receive the key 11 are each formed with a pair of peripheral radially extending diametrically opposed slots 22 and 23 (Figure 2) of mutually different width which just receive the unthickened rib 16 and the thicker portion 18 of the other rib 16, respectively. Thus, the key 11 can be inserted through the holes 20 and 21 in only one angular orientation.

When the key 11 is inserted through the holes 20 and 21 from the side of the base 1, the ribs 15 on the portion 13 of the key 11 become received in the slots 22 and 23 in the base 1 and cover 5 thereby to prevent rotation of the key 11 relative to the base 1. The free end portions 17 of the ribs 16 pass through the slots 22 and 23 in the cover 5, being deflected inwardly as they pass through, and then return to their original condition to engage the outside of the cover 5 thereby to resist withdrawal of the key 11. As shown in Figure 4 the free end portions 17 have cam surfaces 19 which engage the cover 5 and cam the free end portions 17 inwardly to permit withdrawal of the key 11 from the holes 20 and 21 when required by the application of a sufficiently high force.

The portions 13 and 14 of the key 11 are connected by way of a portion 30 formed by a plurality of radially extending flanges 31 having their outer ends joined by removable circumferential actuator surfaces 32 respectively associated with the resilient contacts 2.

The arrangement is such that when the key 11 is inserted through the holes 20 and 21 in the base 1 and cover 5 the free ends of the arms 10 of the resilient contacts 2

engage the surfaces 32 on the key 11 where they are present this effecting closing of a resilient contact 2 so engaged onto the associated fixed contact 3, as shown for the two pairs of contacts shown in Figure 1. However, if a surface 32 has been removed, then on insertion of the key 11 the associated resilient contact 2 is not engaged and does not contact its associated fixed contact 3. Figure 4 shows the key 11 with one surface 32 removed.

Thus, by removing surfaces 32 as necessary the switch 10 can be used as a coding device by providing connections through only required ones of the contact pairs 2 and 3. Thereafter, by the removal of further surfaces 32, or by the use of a different coding key 11 having different actuator surfaces removed, the coding can be changed.

15 For use, the switch is mounted on a printed circuit board with the contact pins received in holes in the board and electrically connected to conductors thereon, there being a hole in the board aligned with the holes 20 and 21 in the base 1 and cover 5, such that the coding key 11 can 20 be inserted through the hole in the board until the head 12 of the key 11 engages the surface of the board remote from that on which the base 1 and cover 5 with the contact 2 and 2 thereon, are mounted.

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Claims:-

1. An electrical switch characterised by a plurality of resilient contacts (2) mounted on an insulating base (1) in an array about a hole (20) in the base (1); a plurality of fixed contacts (3) mounted on the base (1) and respectively associated with the resilient contacts (2); and a coding key (11) receivable in the hole (20) in the base (1) in a particular orientation and formed with a plurality of removable actuator surfaces (32) respectively associated with the resilient contacts (2), the presence or absence of any actuator surface (32) determining the closed or open state of the associated resilient and fixed contact pair (2, 3) when the key (11) is inserted into the hole (20) in the base (1).
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15. A switch as claimed in Claim 1, characterised by a cover (5) enclosing the resilient and fixed contacts (2, 3) on the base (1) and having a hole (21) through which the key (11) passes.
20. A switch as claimed in Claim 2, characterised in that the cover (5) is secured to the base (1) by means of the fixed contacts (3) which have hooked portions (6) engaged in holes (7) in the cover (5).
25. A switch as claimed in any preceding claim, characterised in that the resilient and fixed contacts (2, 3) have pin portions (4) all projecting from a common face of the base (1) for receipt in holes in a printed circuit board.
30. A switch as claimed in any preceding claim, characterised in that each resilient contact (2) extends from the base (1) as a single inner limb (8) which divides into two outer limbs (9, 10) one of which (9) co-operates with the associated fixed contact (3) and the other of which (10) projects inwardly towards the axis of the base (1) for co-operation with the associated actuator surface (32) of the coding key (11).
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6. A switch as claimed in any preceding claim,
characterised in that the coding key (11) is formed with
longitudinal ribs (15, 16) receivable in slots (22, 23)
open to the hole (20) in the base (1) to prevent rotation
5 of the key (11) relative to the base (1)..

7. A switch as claimed in Claim 6, characterised in
that the slots (22, 23) in the base (1) are of mutually
different width, one of the ribs (16) on the key (11) having
a thickened portion (18) receivable in the larger slot (23)
10 only whereby the key (11) can be inserted into the hole (20)
in the base (1) in only one angular orientation.

8. A switch as claimed in Claim 6 or Claim 7, as
dependent upon Claim 2, characterised in that the ribs (16)
have outwardly flared free end portions (17) which are
15 deflected inwardly on passage through the hole (21) in the
cover (5) and thereafter return to their original condition
to secure the key (11) in the holes (20, 21) in the base (1)
and cover (5).

9. A switch as claimed in any preceding claim,
20 characterised in that the coding key (11) has a portion
formed by a plurality of radially extending flanges (31)
the outer ends of the flanges (31) being joined by the
removable actuator surfaces (32).

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FIG.1.

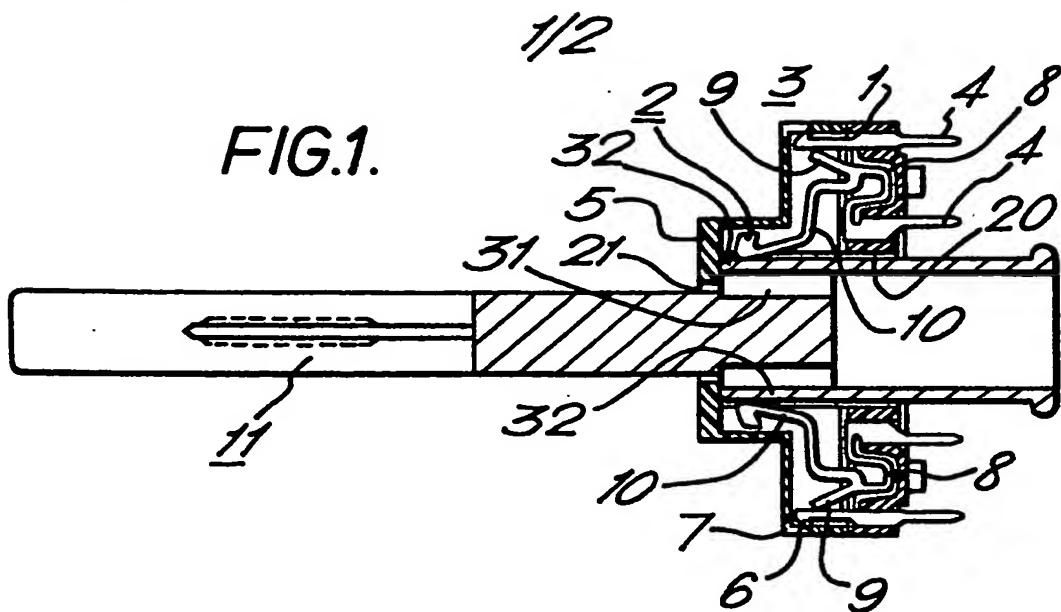


FIG.2.

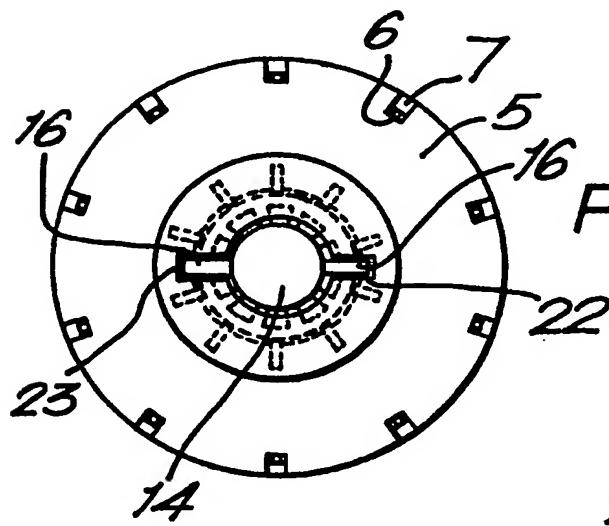
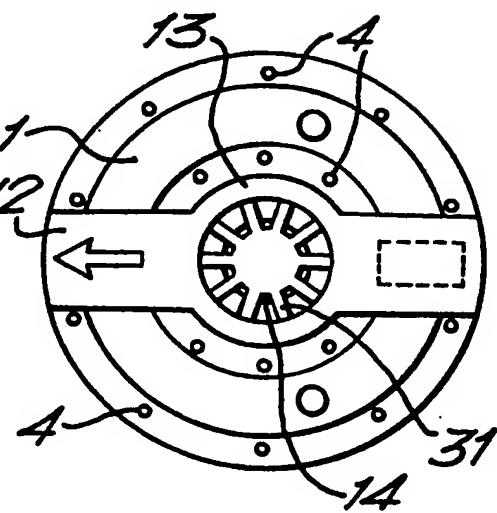


FIG.3.



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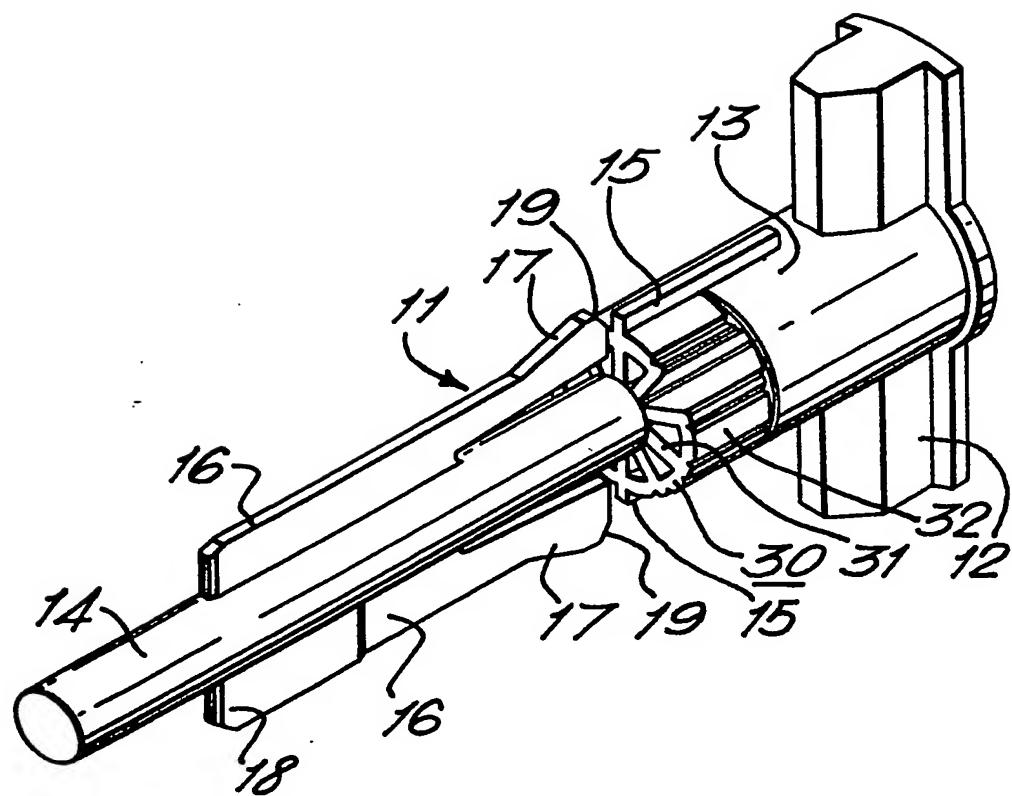


FIG.4.